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ABSTRACT

A five-point school subjects attitude scale, based on the semantic differential technique, was developed after two rounds of factor analysis; it contained 24 bipolar adjectives, each representing one of three factors: evaluation, usefulness, and difficulty. The scale was administered to Alberta (Canada) students in grades 5 and 8, who were identified by their teachers as having the most positive or least positive attitude toward social science. Students rated four subjects: (1) social science; (2) science; (3) subject most liked, useful, or difficult; (4) subject least liked, useful, or difficult. The scale was highly reliable on the evaluation and usefulness factors, and adequately reliable on the difficulty factor. It distinguished clearly between students identified as having positive or negative attitudes toward social studies. Males had a more positive attitude toward science but did not differ significantly from females on social studies ratings. Attitudes of subculture students became more negative from grade 5 to grade 8. A second study improved test-retest reliability of the usefulness and difficulty factors, established scale reliability for grades 5 to 11, and recommended development of norms. (The manual for scale administration, scoring, and interpretation is included, as are the 24 items.) (CP)

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School Subjects Attitude Scales

Technical Report

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MAY, 1979

Alberta

Minister's Advisory Committee on Student Achievement

TM request

TECHNICAL REPORT

on the

SCHOOL SUBJECTS ATTITUDE SCALES

Sponsored and Funded by

THE MINISTER'S ADVISORY COMMITTEE ON STUDENT ACHIEVEMENT

(MACOSA)

Alberta Education

Developed by

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December 1978

School Subjects Attitude Scales

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SCHOOL SUBJECTS ATTITUDE SCALES

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Chapter 1

Development of the Scale

Background

The Minister's Advisory Committee on School Achievement (MACOSA) of Alberta Education was assisted by a steering committee for the Attitude Test Study. This steering committee had the following membership:

Dr. Terry Mott, Alberta Education (Chairman)
Mr. Tony Tymko, Edmonton R.C.S. School District
Dr. Harry Mosychuk, Edmonton Public School District
Dr. Wally Unruh, Faculty of Education, University of Calgary

Initially, Dr. Tom Maguire of the Faculty of Education, University of Alberta, was a member of the committee and made valuable input until he resigned in order to work on another project. The committee met three times during the spring of 1978, and a subcommittee met for a full-day work session. As a result of these deliberations the committee recommended that the Semantic Differential approach be pursued as one means of evaluating student attitude toward school subjects. The present authors were commissioned to carry out this project which was recommended by the Minister's Advisory Committee on School Achievement, and was funded by a research grant from Planning and Research, Alberta Education.

The Semantic Differential Technique

The Semantic Differential Technique, as described by Osgood, Suci, and Tannenbaum (1957), was developed originally for measurement of concepts. The respondent is requested to indicate the meaning he or she attaches to a given concept by recording it on a rating scale (usually 5 or 7 point) between carefully selected bipolar adjectives. Fishbein and Ajzen (1975) made the following statements about the technique (p. 74).

> Ascertaining an object's meaning was viewed as similar to playing the game of "Twenty Questions" with the respondent. Thus, to identify the meaning of a given object, the respondents might be asked questions such as: "Is it hard or soft?" "Is it fast or slow?" etc.

Thus, just as in the "Twenty Questions" game the object being sought is gradually identified, so the selection among pairs of common verbal opposites should gradually establish the 'meaning' of the concept.

Many studies involving different concepts and different bipolar adjectives have repeatedly found three basic factors or dimensions. The first is called evaluation and is associated with scales such as good-bad, pleasant-unpleasant, beautiful-ugly, positive-negative. The second, potency, is associated with strong-weak, light-heavy, hard-soft, and the like. The third, activity, is characterized by scales such as active-passive, fast-slow, excitable-calm. These factors are mutually independent and usually account for most of the variance in the data.

Factor analysis of results from a number of scales is used to identify the number of dimensions which are being assessed. Thus, if the ratings on two scales (such as good-bad and clean-dirty) are highly correlated, these scales may be regarded as alternate measures of the same underlying dimension (or factor, or, in the case of the semantic differential, meaning).

The concepts being considered in this study of attitudes toward school subjects are the names of school subjects and derived terms e.g. science, science experiments. The School Subject Attitude Scale was to be developed initially with students at the Grade 5 and Grade 8 levels.

Procedures Used in Securing Bipolar Adjectives

There is considerable evidence on the use of the semantic differential with adults and university students, but much less with respect to younger students. A search of the literature (particularly M.Ed. and Ph.D. theses at The University of Alberta) books on attitude measurement, and previously used scales, enabled the authors to develop an initial list of more than 100 bipolar adjectives. This list was scrutinized for those which were plainly inappropriate. After this initial culling there remained 53 pairs as follows.

neat	-	sloppy	temporary	-	lasting
loud	-	soft	alert	-	dull
gloomy	-	cheerful	intelligent	-	unintelligent
familiar	-	strange	bold	-	timid
fancy	-	plain	meaningful	-	meaningless
bright	-	dull	usual	-	unusual
friendly	-	unfriendly	steady	-	changing
sharp	-	blurry	cheerful	-	solemn
rough	-	smooth	smart	-	stupid
moving	-	still	happy	-	sad
dull	-	sharp	easy	-	hard
careless	-	careful	fair	-	unfair
polished	-	unpolished	bad	-	good
calm	-	upset	slow	-	fast
useful	-	useless	nice	-	awful

pleasant	-	unpleasant
boring	-	interesting
exciting	-	dull
unimportant	-	important
energetic	-	tired
certain	-	uncertain
unsure	-	confident
restful	-	nervous
clear	-	confusing
valuable	-	worthless
easy	-	difficult
weak	-	strong
foolish	-	wise
shallow	-	deep
warm	-	cool
neat	-	jumbled
dead	-	alive
asleep	-	awake
still	-	active
hard	-	soft
far	-	near
light	-	heavy
ugly	-	beautiful

For students of Grades 5 and 8 it was decided that a five-point scale was adequate. It was decided that the bipolar adjectives would be typed on optical scanning sheets for machine scoring. The directions attached to the scale are given in Appendix 1.

The 53 pairs of bipolar adjectives were administered to a few students by the researchers on a one-to-one basis. Each student was encouraged to "comment out loud" on the items. On the basis of these comments and their own judgements, the researchers eliminated seven pairs, and organized the remainder into two School Subject Attitude Scales as follows:

easy	-	hard
fair	-	unfair
bad	-	good
slow	-	fast
nice	-	awful
weak	-	strong
unsure	-	confident
restful	-	nervous
clear	-	confusing
neat	-	jumbled
dead	-	alive
still	-	active
hard	-	soft
light	-	heavy
temporary	-	lasting
alert	-	dull
meaningful	-	meaningless
usual	-	unusual
cheerful	-	solemn
smart	-	stupid
happy	-	sad
lively	-	deadly
like	-	dislike
like	-	dislike
easy	-	hard
neat	-	sloppy
bright	-	dull
exciting	-	tiresome
rough	-	smooth
loud	-	soft
good	-	bad
familiar	-	strange
fancy	-	plain
friendly	-	unfriendly
sharp	-	blurry
moving	-	still
dull	-	sharp
careless	-	careful
calm	-	upset
useful	-	useless
pleasant	-	unpleasant
boring	-	interesting
unimportant	-	important
certain	-	uncertain
valuable	-	worthless
gloomy	-	cheerful

The forms used are shown in Appendix 2.

First Round of Rating and Analysis

Three teachers, especially engaged for the task, administered the scales during May, 1978 to 12 classes of each of Grade 5 and Grade 8 students as shown in Table 1.

Table 1

School Subjects Attitude Scale

Classes Participating in Round One Ratings

Grade	Classes	School	Principal
5	2	Northmount Elementary 14020 - 88A Street Edmonton	Ron Rhine
5	2	Fr. Leo Green 7512 - 144 Avenue Edmonton	Frank O'Dwyer
5	2	St. Phillips 8808 - 144 Avenue Edmonton	Terry Miskew
5	1	Rudolph Hennig 9512 - 92 Street Fort Saskatchewan	Art Carnahan
5	1	Win Ferguson 9525 - 89 Street Fort Saskatchewan	Doug Sime
5	1	Millgrove Elementary Spruce Grove	Greg Jeglum
5	2	Kitaskinaw Enoch Reserve	Stan Woloshyn
5	1	Winterburn Winterburn	Keith Asquith
8	2	Dickensfield 14320 - 88A Street Edmonton	Ron Rhine
8	4	H.E. Bereault 8215 - 167 Street Edmonton	C. Goulet
8	2	Fort Saskatchewan Jr. Hi. 9607 Sheraton Drive Fort Saskatchewan	Dave Clark
8	1	Woodhaven Spruce Grove	Neil McDowell
8	2	Kitaskinaw Enoch Reserve	Stan Woloshyn
8	1	Winterburn Winterburn	Keith Asquith

Experience with the administration of the scales showed that the directions were reasonably adequate, that students had little difficulty in grasping the nature of the task, and that the time required to complete the forms for one subject was in the order of ten minutes.

All of the students rated two school subjects chosen by the administrator from a list provided. The number of grade five students who completed forms was 441, and for grade eight the number was 307.

Pairs of adjectives were selected for further ratings on the basis of results of the first round. A factor analysis with varimax rotation was carried out, and only those adjective pairs that had factor loadings above .6 and communalities greater than .3 were selected for further testing.

Second Round of Testing

As a result of the selection of bipolar adjectives based on performance in the first round of ratings, a new form (see Appendix 3) containing twenty-four pairs was constructed for the second round of ratings. Two of the three teachers who administered the first scales were engaged for the second administration, conducted in mid-June. Twelve classes of each of Grade 5 and 8 in 13 schools as listed in Table 2 were used.

The second round of rating involved 307 Grade 8 students and 437 Grade 5 students. Each student rated two subjects; one was social studies, the other was chosen by the administrator from the list of subjects provided.

Several factor analyses were conducted, involving different subjects or combinations of subjects, and one or both of the grades. The clearest factors seemed to emerge when all the forms for both grades were combined. A total of 1,474 test forms were processed for this analysis. The results are shown in Table 3. The three factors that emerged after varimax rotation were labelled, for convenience, evaluation, usefulness, and difficulty.

On the basis of the data shown in Table 3, the instrument for use in the third round of rating was constructed. For each of the three factors the adjective pairs having the highest loadings were selected. These were placed first on the list on the new instrument, and were followed by the remaining 12 pairs. Some of the pairs were reversed so that the positive end of each scale appeared at the left and at the right an equal number of times. For instance, the pair "like-dislike" in the instrument used for second round ratings appeared as "dislike-like" in the revised form. The purpose behind the selection of four adjective pairs from each factor and placing them first was to simplify processing in case a short, twelve-pair version of the attitude scales was to be compared with the complete version.

School Subjects Attitude Scale

Classes Participating in Round Two Ratings

Grade	Classes	School	Principal
5	2	Rundle Elementary 11005 - 34 Street	Ivor Dent
5	2	Father Leo Green 7512 - 144 Street	Frank O'Dwyer
5	2	St. Phillips 8808 - 144 Avenue	Terry Miskew
5	1	Rudolph Hennig 9512 - 92 Street Fort Saskatchewan	Art Carnahan
5	1	Win Ferguson 9529 - 89 Street Fort Saskatchewan	Doug Sime
5	2	St. Hilda 7630 - 38 Avenue	Ronald Jirry
5	1	Millgrove Elementary Spruce Grove	Greg Jeglum
5	2	Kitaskinaw Enoch Reserve	Stan Woloshyn
5	1	Winterburn Winterburn	Keith Asquith
8	2	Brittania Junior High 16018 - 104 Avenue	William Barabash
8	4	St. Edmonds 11712 - 130 Avenue	Rod MacIsaac
8	2	Fort Saskatchewan Junior High 9607 Sheraton Drive Fort Saskatchewan	Dave Clark
8	1	Woodhaven Spruce Grove	Neil McDowell
8	2	Kitaskinaw Enoch Reserve	Stan Woloshyn
8	1	Winterburn Winterburn	Keith Asquith

A short version would no doubt be valuable if the results were
the same as for the long version, especially in cases where
hers might wish to hand score forms for their classes.

It was noted that the three factors that appeared bore some
larity to the factors expected on the basis of the work of
od, et al (1957), evaluation, activity, and potency. The
lts of the analyses reported here indicated that the evaluation
or included several adjective pairs ordinarily associated with
activity factor, such as listless - lively, alert - dull, and
e - dead. It would appear that to students in this study, being
d was scarcely distinguishable from being active.

The difficulty factor was not initially expected; however, it
ains some of the pairs that other scales would include in the
ncy factor. The name "difficulty" was applied, however, because
easy - hard pair seemed to dominate.

d Round of Ratings

The instrument employed for the third round of ratings is shown
Appendix 4. The purpose of this set of ratings was essentially
determine the reliability of the instrument and to gather
ence on its validity for use in the schools. Some modification
he directions, chiefly to provide examples, was developed during
round, as shown in Appendix 5.

Table 3

Varimax Rotated Factor Matrix for All School Subjects, Grades 5 and 8
June, 1978 Rating

Adjective Pairs		Evaluation	Loadings Usefulness	Difficulty	Communality
happy	sad	.696	---	---	.662
pleasant	unpleasant	.725	---	---	.699
exciting	tiresome	.737	---	---	.685
boring	interesting	-.696	---	---	.623
lively	listless	.736	---	---	.653
like	dislike	.728	---	---	.731
bright	dull	.751	---	---	.731
nice	awful	.714	---	---	.703
dead	alive	-.714	---	---	.747
alert	dull	.696	---	---	.662
still	active	-.600	---	---	.444
meaningful	meaningless	---	.645	---	.546
smart	stupid	.455	.549	---	.568
bad	good	-.544	-.503	---	.599
useful	useless	---	.763	---	.711
important	unimportant	---	.791	---	.705
valuable	worthless	---	.786	---	.710
necessary	unnecessary	---	.773	---	.700
clear	confusing	.377	---	.532	.480
hard	soft	---	---	-.697	.512
light	heavy	---	---	.620	.442
easy	hard	---	---	.758	.657
familiar	strange	---	---	.496	.396
certain	uncertain	.410	.393	.446	.522

Chapter 2

Procedure

Data Collection

The data collected included teacher identification of approximately one-quarter of the students in a class with the most positive attitude toward social studies, and the one-quarter with the least positive attitude. Achievement data in the school subjects (social studies and science) were also collected where available. Some students were asked to identify the subject liked most and liked least and rate each, others to identify the subject most useful and least useful and rate each, and still others to identify the subject most difficult and least difficult and to rate each. In one school intelligence test results from the end of the preceding year were available. In two schools, students whose parents were from a distinct subculture were identified. All students rated four subjects in this order: first social studies, then "like most" (or "most useful: or "most difficult"), then "like least" (or "least useful" or "least difficult"), then science. Table 4 sets forth the schools involved in round three ratings. One of these, St. Paul, was a school with an academic emphasis, particularly at the Grade 8 level, with about four-fifths of the students being brought to the school from other areas, in order to avail themselves of the academic emphasis. One class in Clover Bar school was specified as having an academic emphasis. In two of the schools (Millshaven and Clover Bar), approximately one month after the initial rating the students again rated four subjects, including social studies and science. In all records for 557 students were processed. Records for approximately 20 students were not processed because it was obvious that the students had not comprehended the task. All of these were for fifth grade students. The breakdown by grade and sex is shown in Table 5. Table 6 shows the breakdown by subject and designation given by students.

In processing the data scores of -2, -1, 0, +1 and +2 were assigned respectively to the descriptive terms, very much, a bit, neither, a bit, and very much. The signs of the values were reversed when appropriate so that the positive numbers were associated with positive attitudes. For example, the scale for the first pair of adjectives, exciting - tiresome, was reversed so that a response of "very much" exciting would be given a score value of +2, while -2 would correspond to a response of "very much" tiresome.

Table 4

School Subject Attitude Scale

Classes Participating in Round 3 Ratings

Grade	Classes	School	Principal
5	4	Vera M. Welch Lac La Biche	Paul Muni
5	4	Millshaven 73 Main Blvd. Sherwood Park	Ron Mundell
5	1	St. Paul 14410 - 96 Avenue Edmonton	Carl Brodie
8	6	Dr. Swift Lac La Biche	Tom Moore
8	6	Clover Bar Jr. High 50 Main Blvd. Sherwood Park	Lue Chmelyk
8	3	St. Paul 14410 - 96 Avenue Edmonton	Carl Brodie

Table 5

Breakdown of Student Sample by Sex and Grade

Grade	Sex			Total
	Male	Female	Not Specified	
5	95	104	7	206
8	185	156	10	351
Total	280	260	17	557

Table 6

Breakdown by Subject and Designations Given by Students

Subject	Liked		Useful		Difficulty	
	Most	Least	Most	Least	Easiest	Hardest
Soc. Studies	0	7	26	9	1	1
Math.	24	52	111	10	12	12
Science	5	58	31	31	4	12
Lit. (Reading)	2	11	18	6	0	1
Lang. (Writing)	4	68	22	14	1	7
Health	1	14	3	12	0	0
Phys. Ed.	84	7	20	29	10	1
French	0	16	4	31	2	2
Music	36	6	5	51	0	0
Art	26	1	14	48	0	0
Drama	9	2	0	15	2	3
Ind. Arts	22	2	19	4	2	1
Home Ec.	35	1	14	0	4	0
Typing	2	1	0	2	0	0
	250	246	287	262	38	40

Reliability Studies

The data were analyzed to obtain three estimates of reliability: coefficient alpha, a test-retest at one sitting, and a test-retest after one month. The one sitting type of reliability was obtained by comparing student ratings of social studies with the rating given at the same sitting if social studies was selected as a preference (like most, like least, most useful, etc.) and from similar data for science.

Validity Studies

Validity studies of the instrument centred about the question of whether or not attitudes of students towards school subjects were really being measured. Answers to this question were sought through three more specific questions:

a) Does the instrument distinguish between different groups in a logical way?
b) Do attitude scores correlate with other variables in a logical fashion?
c) Do the same factors emerge when a different group of students rate school subjects?

In order to answer these questions, the data were analyzed to obtain evidence of validity in six areas as described below.

Expert Opinion

Social studies teachers were asked to identify students in their class who had positive attitudes toward social studies as well as those who had negative attitudes towards the subject. Teachers were told that five or six students in each category might be expected, but that more or fewer could be chosen, depending on the class. That is, a particularly good class might have only one or two students with negative attitudes, and a particularly uncooperative class might have only a few or no students with positive attitudes. Attitude scores for the two groups were then compared.

Student Preferences

Each student was asked to select, from the list of school subjects in the answer sheets, the subject that was liked best and then to rate it on each of the twenty-four bipolar adjectives. Next, each student was asked to select and rate the subject liked least. Means and standard deviations were then compared and differences tested for significance at the $p<.05$ and $p<.01$ levels. Similar procedures were carried out for the usefulness and for the difficulty factors.

Sex Differences

Comparisons of means were made between ratings given by males and females for social studies and for science.

Cultural Differences

Ratings of social studies by students from a distinct sub-culture were compared with ratings of other students.

Relationship with Achievement and Intelligence

Student ratings of science were correlated with achievement in that subject. Final report card marks for Grade 4 and Grade 7 were taken as achievement scores.

For a separate group of students, correlations were completed between science ratings and IQ. The Lorge-Thorndike Test of Intelligence was administered to several classes to determine the IQ.

Factor Analysis

Several factor analyses were carried out primarily as a check on earlier analyses. First, it was necessary to ascertain whether the twenty-four bipolar adjectives clustered as they did during the construction phase of the instrument; and second it was necessary to check whether the use of only four bipolars in each factor would cluster again into three distinct factors.

CHAPTER 3

RESULTS

Reliability Studies

Reliability estimates (internal consistency) were calculated for the long form and the short form scores for each of the three factors. Correlations between the two forms were also computed. In addition to providing required information on the reliability of the testing instrument, this procedure gave information on the adequacy of the short form as compared to the long form. Results are shown in Table 7.

On the basis of figures in Table 7 it was concluded that the instrument provided highly reliable scores, on the evaluative and usefulness dimensions, and that the reliability of the difficulty scores was quite adequate. Also, the high correlations between the long and short forms, and the small differences in the reliability coefficients between the two forms was taken as conclusive evidence that the short form was almost as effective as the long form in assessing attitudes.

Table 8 provides further evidence on the reliability of the instrument. The lower coefficients were all associated with a small number of subjects in the sample. When the sample size was respectable the test-retest reliability coefficients were also respectable.

Coefficients in Table 8 were of interest, but they were not considered good estimates of reliability. The small sample sizes were one obvious drawback, but an equally serious problem was the obvious non-representativeness of the samples. The figures in the table are based on students who felt that social studies (or science) was liked most, liked least, most useful, least useful, easiest or hardest. This restriction of the samples could very well have affected the reliability coefficients.

Table 9 shows test-retest reliability estimates (coefficients of stability) for social studies and science with a time lapse of one month between the two measures.

It is apparent that the reliability coefficients are generally lower for social studies than for science. In addition, the differences between the short form and the long form coefficients tend to be greater for social studies. These differences might be caused by less trait stability in the area of social studies. The subject matter and the methods of instruction in science tend to differ only little from one grade to another, while in social studies there is great variation. Topics of study range over history, civics, geography, current events, other cultures, local problems, etc. It is logical that attitudes might change with changes in topics and methods of study. If this is true, then responses for social studies would be less reliable over time than responses for science.

TABLE 7

Reliability Estimates for Long and Short Forms

Factor	Grade	N	Coefficient Alpha For: Long Form	Short Form	Correlation Between Forms
Evaluation	5 & 8	2220	.959	.911	.945
Usefulness	5 & 8	2220	.912	.901	.966
Difficulty	5 & 8	2220	.831	.816	.944
Evaluation	5	823	.956	.914	.931
Usefulness	5	823	.910	.894	.963
Difficulty	5	823	.812	.801	.937
Evaluation	8	1397	.961	.909	.954
Usefulness	8	1397	.914	.905	.968
Difficulty	8	1397	.831	.81[illegible]	.946

TABLE 8

Test-Retest Reliability

Short Form, No Time Lapse

Subject	Factor	Grade	N	Reliability Coefficient
Social Studies	Evaluation	5 & 8	21	.74
Social Studies	Usefulness	5 & 8	21	.64
Social Studies	Difficulty	5 & 8	21	.62
Science	Evaluation	5 & 8	137	.89
Science	Usefulness	5 & 8	137	.87
Science	Difficulty	5 & 8	137	.81
Social Studies	Evaluation	5	10	.70
Social Studies	Usefulness	5	10	.60
Social Studies	Difficulty	5	10	.42
Science	Evaluation	5	30	.93
Science	Usefulness	5	30	.76
Science	Difficulty	5	30	.81
Social Studies	Evaluation	8	11	.80
Social Studies	Usefulness	8	11	.69
Social Studies	Difficulty	8	11	.80
Science	Evaluation	8	107	.88
Science	Usefulness	8	107	.90
Science	Difficulty	8	107	.80

TABLE 9

Reliability Estimates Based on Re-test After One Month

Factor	Grade	Subject	N	Reliability Long Form	Reliability Short Form
Evaluation	8	Social Studies	118	.67	.52
Usefulness	8	Social Studies	118	.47	.38
Difficulty	8	Social Studies	118	.57	.51
Evaluation	8	Science	119	.68	.68
Usefulness	8	Science	119	.59	.58
Difficulty	8	Science	119	.62	.61
Evaluation	5	Social Studies	90	.67	.57
Usefulness	5	Social Studies	90	.44	.44
Difficulty	5	Social Studies	90	.52	.51
Evaluation	5	Science	89	.65	.58
Usefulness	5	Science	89	.55	.52
Difficulty	5	Science	89	.47	.37

Validity Studies

Expert Opinion

Means and standard deviations of the ratings by students identified as having positive attitudes were calculated. These figures were compared with corresponding figures for the negative attitude group. Table 10 shows these figures.

The figures indicate that the instrument distinguished rather clearly between the students identified as having positive attitudes and those identified as having negative attitudes towards social studies. It appears that the differences in attitudes were reflected in all three of the factors. One would expect teachers' impressions of students' attitudes to be based on such things as care in completing assignments, classroom manners, statements made in class, and achievement. It is therefore logical that students perceived by teachers to have positive attitudes would differ on all three factors of the attitude instrument from students identified as having negative attitudes.

Student Preferences

Figures relative to attitudes to subjects chosen by students are shown in Table 11. It is immediately evident that differences between pairs of means are highly significant and in the expected direction. That is, subjects chosen as being liked most had higher mean ratings on all three factors than subjects chosen as liked least. Similarly, subjects chosen as most useful and easiest received higher ratings than subjects chosen as least useful and hardest, respectively.

Perhaps most important of all, from a validity viewpoint, is the fact that the greatest differences occurred where expected. In other words, the greatest difference for the most liked and least liked subject were found in the evaluation factor; the greatest difference for the most useful and least useful subjects appeared in the usefulness factor; and the difficulty factor contained the greatest difference for subjects chosen as hardest and easiest.

Sex Differences

Table 12 shows differences by grade and by sex for ratings given in Social Studies and Table 13 shows figures for science. As might be expected, there were no significant differences between means at any grade level in social studies. In science, again as might be expected, there were pronounced differences at the grade eight level, indicating that males had more positive attitudes towards science in all three factors.

TABLE 10

Comparisons of Scores of Students with Positive Attitudes and Scores of Students with Negative Attitudes Towards Social Studies

Group	Grade	N	Evaluative Mean	Evaluative S.D.	Usefulness Mean	Usefulness S.D.	Difficulty Mean	Difficulty S.D.
Positive Attitude	5	52	2.73	3.30	4.67	3.53	1.06	3.18
Negative Attitude	5	47	-.06	4.67	1.17	5.17	-.81	4.12
Significance of Difference			$p<.01$	$p<.05$	$p<.01$	$p<.01$	$p<.05$	N.S.
Positive Attitude	8	86	1.79	3.86	5.08	3.18	.60	3.22
Negative Attitude	8	76	-1.74	4.00	1.32	5.05	-1.33	4.00
Significance of Difference			$p<.01$	N.S.	$p<.01$	$p<.01$	$p<.05$	N.S.

TABLE 11

Comparison of Scores on School Subjects Selected by Students

Grades 5 and 8 combined

		Evaluation		Usefulness		Difficulty	
on	N	Mean	S.D.	Mean	S.D.	Mean	S.D.
t	250	6.44	2.66	5.35	3.34	3.24	3.79
st	249	-4.89	3.71	-.17	5.38	-2.65	4.47
cance of Difference		p<.01	N.S.	p<.01	N.S.	p<.01	N.S.
ful	289	4.25	3.93	6.16	3.25	1.69	3.96
ful	267	-1.85	5.17	-1.69	4.75	.19	4.63
cance of Difference		p<.01	N.S.	p<.01	N.S.	p<.01	N.S.
	39	5.00	4.00	5.38	4.45	4.56	2.80
	40	-1.43	4.54	2.07	5.34	-2.97	3.61
cance of Difference		p<.01	N.S.	p<.01	N.S.	p<01	N.S.

TABLE 12

Comparisons of Ratings of Males and Females for Social Studies

Group	Grade	N	Evaluation Mean	Evaluation S.D.	Usefulness Mean	Usefulness S.D.	Difficulty Mean	Difficulty S.D.
Males	5 & 8	293	1.03	3.97	3.54	4.11	-.17	3.45
Females	5 & 8	264	.70	4.21	3.55	4.41	-.39	3.44
Significance of Difference			N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Males	5	103	1.01	4.42	3.02	4.60	.25	3.65
Females	5	107	1.36	4.34	3.75	4.41	-.35	3.75
Significance of Difference			N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Males	8	190	1.04	3.71	3.82	3.80	-.39	3.33
Females	8	157	.25	4.07	3.43	4.42	-.43	3.22
Significance of Difference			N.S.	N.S.	N.S.	$p<.05$	N.S.	N.S.

TABLE 13

Comparison of Ratings of Males and Females for Science

Group	Grade	N	Evaluation Mean	Evaluation S.D.	Usefulness Mean	Usefulness S.D.	Difficulty Mean	Difficulty S.D.
Males	5 & 8	284	1.68	4.54	3.51	4.26	-.44	3.91
Females	5 & 8	263	-.30	5.26	2.22	4.93	-.81	4.45
Significance of Difference			$p<.01$	$p<.05$	$p<.01$	$p<.01$	N.S.	$p<.05$
Males	5	97	1.49	5.10	2.49	4.81	.91	3.98
Females	5	105	.55	5.31	2.60	4.57	.80	4.59
Significance of Difference			N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Males	8	187	1.77	4.23	4.04	3.86	-1.14	3.69
Females	8	158	-.87	5.16	1.97	5.15	-1.87	4.04
Significance of Difference			$p<.01$	$p<.01$	$p<.01$	$p<.01$	N.S.	N.S.

Cultural Differences

Table 14 shows the means and standard deviations of the sub-culture group and the main culture group and compares the figures for the two groups in social studies. Table 15 gives similar data for science.

Figures in Table 14 and Table 15 indicate that there were significant differences in the attitudes of students at the grade eight level but not at the grade five level for social studies and for science. These results are in reasonable agreement with expectations. While interpretations based on Ns as low as 16 are tentative at best, it is possible that attitudes of subculture students change from positive to negative as they progress through the grades. It is possible that social studies and science are perceived as having less and less relevance to the subculture the longer a student remains in school.

Relationship with Achievement and Intelligence

Table 16 shows the correlations between attitude and achievement and attitude and intelligence.

The figures indicate that there were some low, positive, but significant correlations between science attitude ratings and science achievement scores. No significant correlations occurred between attitudes towards science and intelligence.

The non-significant correlations between evaluation and achievement, and evaluation and IQ were to be expected. Many good students like science as do many weak students, and many good students as well as weak students dislike it. This explains the non-significant correlations for achievement and IQ with the evaluation factor.

The low but significant correlations between usefulness and achievement are a matter of conjecture. The fact remains, however, that the values are low; the highest one (.161) accounts for only 3% of the variance.

Factor Analysis

Table 17 shows factor loadings for the twenty-four bipolar adjectives that were obtained in both the June and October ratings. The general pattern of loadings for the different times is very similar, especially with respect to the short form of the scales. Some of the adjective pairs in the long form might be reconsidered with a view to omitting them on future attitude scale forms. The fact remains, however, that the factors are quite stable over the two rating periods.

TABLE 14

Comparisons of Ratings of Subculture Students and Main Culture Students for Social Studies

Group	Grade	N	Evaluation Mean	Evaluation S.D.	Usefulness Mean	Usefulness S.D.	Difficulty Mean	Difficulty S.D.
Subculture Males	5	27	.19	4.62	2.07	5.07	.04	4.00
Main Culture Males	5	75	1.35	4.36	3.40	4.42	.39	3.52
Significance of Difference			N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Subculture Females	5	16	1.44	5.11	2.50	4.23	-.37	3.90
Main Culture Females	5	89	1.29	4.25	3.93	4.45	-.31	3.90
Significance of Difference			N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Subculture Males	8	30	-1.73	3.34	2.40	3.83	-2.37	3.44
Main Culture Males	8	159	1.55	3.56	4.07	3.75	-.01	3.19
Significance of Difference			$p<.01$	N.S.	$p<.05$	N.S.	$p<.01$	N.S.
Subculture Females	8	45	-1.16	3.77	1.82	4.83	-.64	3.41
Main Culture Females	8	111	.86	4.05	4.04	4.10	-.29	3.13
Significance of Difference			$p<.01$	N.S.	$p<.01$	N.S.	N.S.	N.S.

TABLE 15

Comparison of Ratings of Subculture Students and Main Culture Students for Science

Group	Grade	N	Evaluation Mean	Evaluation S.D.	Usefulness Mean	Usefulness S.D.	Difficulty Mean	Difficulty S.D.
Subculture Males	5	25	.24	5.47	1.16	5.16	1.04	4.46
Main Culture Males	5	71	1.96	4.96	2.99	4.66	.89	3.86
Significance of Difference			N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Subculture Females	5	15	0.00	5.93	.67	3.96	2.27	4.45
Main Culture Females	5	88	.66	5.26	3.06	4.54	.64	4.59
Significance of Difference			N.S.	N.S.	$p<.05$	N.S.	N.S.	N.S.
Subculture Males	8	31	-.06	4.44	2.58	4.04	-2.68	3.50
Main Culture Males	8	155	2.13	4.12	4.32	3.78	-.82	3.67
Significance of Difference			$p<.05$	N.S.	$p<.05$	N.S.	$p<.01$	N.S.
Subculture Females	8	45	-2.47	4.78	-.51	4.80	-3.11	3.98
Main Culture Females	8	113	-.23	5.19	2.96	4.97	-1.39	3.97
Significance of Difference			$p<.05$	N.S.	$p<.01$	N.S.	$p<.05$	N.S.

TABLE 16

Attitude-Achievement and Attitude-IQ Correlations

Science Attitude Factor	Science Achievement			IQ		
	Males	Females	Total	Males	Females	Total
N=	239	266	511	70	60	132
Evaluation	-.010	.050	-.001	.101	-.197	-.052
Usefulness	.117	.161*	.116**	.179	-.119	-.013
Difficulty	-.045	.127*	.048	-.049	-.003	-.029

* $p < .05$

** $p < .01$

TABLE 17

Varimax Rotated Factor Loadings* for All School Subjects, Grades 5 and 8 October and June, 1978 Ratings

Adjective Pair	Evaluation		Usefulness		Difficulty	
	Oct.	June	Oct.	June	Oct.	June
exciting-tiresome	.764	.737				
dislike-like	.734	.728				
listless-lively	.739	.736				
bright-dull	.739	.751				
important-unimportant			.770	.791		
worthless-valuable			.769	.786		
unnecessary-necessary			.808	.773		
useful-useless			.699	.763		
hard-soft					.749	.697
light-heavy					.706	.620
easy-hard					.729	.758
confusing-clear					.573	.532
pleasant-unpleasant	.693	.725				
boring-interesting	.752	.696				
nice-awful	.730	.714				
alive-dead	.758	.714				
still-active	.676	.600				
meaningful-meaningless			.680	.645		
smart-stupid	.524	.455	.475	.549		
bad-good	.569	.544	.517	.503		
familiar-strange					.436	.496
sad-happy	.614	.696				
alert-dull	.673	.696				
uncertain-certain	.436	.410	.380	.393	.361	.446

CHAPTER 4

GENERAL DISCUSSION

Findings

The School Subjects Attitude Scales seemed to show promise for use in upper elementary and junior high school grades. The field trial of the instrument indicated that reliabilities were high enough to warrant use for groups (but not for individuals) to determine attitudes towards school subjects. This is true for the three factors or attitude measures involved, evaluation, usefulness, and difficulty. The short forms of the three factors seem to yield scores quite satisfactory from a reliability viewpoint.

The test-retest reliability coefficients for social studies were generally lower than for science, and discrepancies between coefficients for the long form and the short form tended to be greater. This might be caused by trait unreliability, as opposed to instrument unreliability, as was mentioned in connection with the discussion of Table 10, but further study should be made to determine if changes in the attitude scales should be made. One of the possibilities is that the evaluation scale, which includes bipolar adjectives ordinarily found in the activity scale, should be expanded to represent both aspects more adequately.

The validity studies all yielded encouraging results. Clear answers were provided to the three specific questions relating to validity that were posed earlier (see page 3).

The instrument distinguished students deemed by the teachers to have positive attitudes from those deemed to have negative attitudes. Similarly, mean ratings were clearly higher for subjects identified by the students to be liked most, most useful, and easiest than for subjects identified by the same students as liked least, least useful, and hardest.

Sex differences followed a logical pattern insofar as the study investigated this aspect. Differences between mean ratings for males and females in social studies were not significant, but for science the mean ratings for the two sexes indicated a more positive attitude on the part of the males.

Differences in means between distinct subculture groups followed a logical pattern in that attitudes tended to become less positive as students progressed from grade five to grade eight. For the classes with an academic orientation the means did not differ from the means of other students.

The second specific question on the topic of validity was related to correlations among variables. Here, again, the figures derived followed logical patterns. The correlations between attitude and achievement ranged from non-significant (zero) to low positive, and between attitude and

IQ the correlations were all non-significant.

With respect to the third question related to validity, the factor analyses indicated that the factor loadings were essentially unchanged. Each bipolar pair loaded on the same factor as it did for the round two rating, although there were some fluctations in the actual correlations between adjective pairs and factors.

Some Words of Caution

People contemplating use of the School Subjects Attitude Scales should bear in mind that the instrument has proven somewhat effective so far only for grades 5 and 8. While it seems logical that it would be useful in other grades as well that has not yet been demonstrated. Furthermore, it is likely that the effectiveness is present only if the administration procedures approximate those used in this study. In particular, it is important that the students feel that their responses will in no way harm nor benefit their standing in school. For this reason, as was mentioned earlier, the students should not be asked to put their names on the response sheets, nor should the scales be administered by one of their classroom teachers.

Users of the instrument must bear in mind that the data in this technical manual were not gathered from a representative sample of students. The mean ratings for grades and for different subjects should therefore not be considered representative of Alberta students.

Observations

Some interesting observations were made that were not part of the actual study. It was thought worthwhile to mention them here.

For the group tested it was interesting to note that the average response was mildly positive on the evaluation and usefulness scales, and mildly negative on the difficulty scales. If these figures actually represent Alberta students (and they might not) one might speculate that there is enough challenge in the course offerings for the average student. It must be hastily added that this is conjecture and certainly requires more study before a conclusion could be reached.

The fact that the "non-academic" subjects were more often chosen as the most liked, and the easiest, while "academic" subjects tended to be picked as the most useful has interesting possibilities for further study.

Further Study

The relatively low retest reliabilities after a one month lapse that occurred for social studies, and the larger-than-expected discrepancies between the long form and short form reliabilities for social studies indicate that more work should be done, particularly on the evaluative scale. It is likely that increasing the number of bipolar adjectives, giving careful consideration to the number of "activity" pairs to be included, would strengthen this factor. The other factors might also be strengthened by adding one or two more satisfactory adjective pairs than those presently in the instrument. This is provided, of course, that such pairs can be found.

The lack of norms for the present instrument places a restriction on the use of the instrument. Norms by grade, sex and subject are obviously needed, and it seems necessary also to have norms for different times of the year if real comparisons are to be made.

There is no reason why researchers in the field cannot use the instrument as it now exists. While norms are not available, it would still be useful for direct comparisons and in situations where a pre- and post rating can be made. Such obvious situations as the establishment of a new curriculum, or the installation of new facilities are examples of possible candidates for the use of the School Subjects Attitude Scales.

Recommendations

The following recommendations are respectfully made, after careful consideration of the results to date. They are presented as a small number of major recommendations, with illustrative detail and reasons following each.

1. The School Subjects Attitude Scales should be developed further.

   Illustrative detail include the following:

   1.1 The 12 bipolar pair short form should be developed.
   1.2 Minor revisions in the scale should be made and tried out.
   1.3 Minor revisions in instructions to students should be made and tried out.
   1.4 A completely revised response sheet should be developed, with instructions one side and the scales on the other, if feasible.
   1.5 The revised response sheet should include a space for the subject the student is rating but there should be no indication that the student's name is required.
   1.6 The School Subjects Attitude Scale should be tried out on students at the high school level.

It is recommended that the scales be developed further for a number of reasons. No other similar scales are commercially available. Student attitudes toward a school subject is an important variable (along with such others as ability, motivation, and good teaching) in school achievement. For program evaluation prior to curricular change and after the introduction of a change, students' attitudes could be assessed as an important ingredient. For these and like reasons it is recommended that the scales be developed further.

The data collected so far clearly indicate that the short form of the S.S.A.S. is reliable and valid. Since it is likely that, for extended use, hand-scoring will be necessary, the shorter version will save considerable time and therefore expense, and will therefore make the scales much more usable.

Experience with the scales so far indicates that minor revisions in both the scales and the instructions to students would constitute improvement. The response sheet used to date has been an adaptation from a general optical scoring sheet. A specialized sheet should be developed. It is proposed that the scales be used for classroom groups (not individuals) hence names are not required. In addition, anonymity is essential to mitigate faking.

The development so far has been at the grades five and eight levels. It seems likely that the scales would be eminently suitable at the high school level, but this should be ascertained through a tryout.

2. Alberta norms should be established.

   Illustrative detail include the following:

   2.1 Norms should be established by sex.
   2.2 Norms should be established by grade.
   2.3 Norms should be established by time of year; eg. mid-October, December, March, June.
   2.4 Norms should be established for all required (academic) subjects.
   2.5 Norms should be established for selected non-academic subjects.
   2.6 Norms should be established according to the procedures for administration to be developed under recommendation 3.

Norms are required so that any one class can be compared with classes across the province. It is proposed that there be breakdowns by sex, grade, time of year, and subject since each of these, it is anticipated, will affect scores on the school subject attitude scale.

3. A user's manual should be developed.

   3.1 The manual should include a description of the scale (rationale, purposes, development, etc.)

3.2 The manual should include directions for administration (time required, suggested time of day, measures to reassure students about privacy of response, etc.)
3.3 The manual should include a hand scoring key (if possible, maximum possible score be in familiar terms such as 100).
3.4 The manual should include norms by

3.4.1 sex
3.4.2 time of year; eg. mid-October, mid-December, mid-March, mid-June
3.4.3 grade level
3.4.4 subject: all academic subjects and selected non-academic subjects

To date, the scales have been administered by someone other than in-school personnel. For successful use, it must be capable of utilization by teachers and others. Because any attitude scale is susceptible to faking, the manual must emphasize use for classes (as opposed to individuals), anonymity, privacy of response, and other measures to minimize faking. A hand-scoring key and a familiar range of scores (eg. maximum positive score is 100) should be included.

4. A name for the scale should be approved.

Illustrative detail include the following:

4.1 The name might be the Nyberg-Clarke School Subject Attitude Scales; or
4.2 The name might be the Alberta School Subject Attitude Scales; or
4.3 The name might be the School Subjects Attitude Scales.

The illustrative detail is listed in order of preference. For example, there is the Watson-Glaser Test of Critical Thinking, and the Lorge-Thorndike intelligence test. These names clearly specify particular scales. The second proposal (4.2) could carry the desirable connotation that it is Alberta school subjects and students that are involved, and that the scales would be inappropriate for use in other provinces. The acronym is a bit unfortunate. The third proposal (4.3) is the nomenclature which has been used so far. It appears to be presumptuously broad.

Since the authors did the developmental work under a research grant, and no commercial advantage such as royalties is anticipated, it appears reasonable that their efforts be recognized by the name on the test.

5. The scales should be produced and retailed by the School Book Branch.

5.1 That the editing and printing of the manuals and response sheet be done by the School Book Branch.
5.2 That the test materials be retailed at cost.

If the scales are to be used, test forms must be readily available. It

appears that the best vehicle for this would be the School Book Branch.

6. The scales should be revised and re-normed commencing in 1984.

   6.1 The scales should be revised following steps similar to those employed in development (factor analysis, validation, reliability studies).

   6.2 The scales should be renormed following similar steps as were used in the original development of norms.

As time goes on, the meaning attached to adjectives shifts slightly. In addition, it is quite possible and even likely that student attitudes toward subjects shift. Insofar as there is change in curriculum, norms would require overhaul, since the object being rated would have changed. For these and like reasons, to keep the scales up to date, periodic revision is essential.

SCHOOL SUBJECTS ATTITUDE SCALES

REFERENCES

Fishbein, Martin and Ajzen, Icek. Belief, Attitude, Intention, and Behavior, Reading, Mass., Addison-Wesley, 1975.

Osgood, Charles Egerton; Suci, George J.; and Tannenbaum, Percy H. The Measurement of Meaning, Urbana, Illinois, University of Illinois Press, 1957.

APPENDIX 1

Directions for Rating, First Round

Directions

Student Opinions of School Subjects

How students feel about school subjects is very important, therefore, you are asked to fill out the forms given on the next two pages.

This is not a test. There are no answers that are "right" or "wrong". The important thing is to tell how you feel.

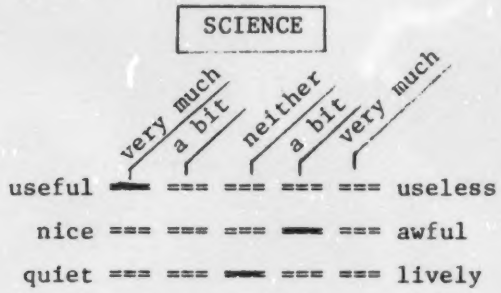
At the top of each answer sheet is a box called SUBJECT. You will be told which school subject to write in this box.

Tell how you feel about that subject by placing a mark between each of the pairs of words that appear below the box.

You can see that each set of two words is a pair of opposites. Mark the space between each pair of words that tells how you feel about the subject named in the box at the top of the page. Each space has a label at the top of the list to help you decide where you should place your marks.

Here is an example:

SUBJECT



A student who thought that SCIENCE was very much useful, a bit awful, and neither quiet nor lively would mark the spaces as shown.

Work quickly. It is better to give your first feelings rather than to think hard about each pair of words. Your marks will be read by a machine, so feel free to tell your real opinions of school subjects.

Turn to the next page. Please raise your hand if you have any questions. If you don't understand some of the words on the form, be sure to ask what they mean.

APPENDIX 2

The following instructions and scales, relative to the first round of ratings, were printed on machine-scoring answer sheets.

SUBJECT

	very much	a bit	neither	a bit	very much	
easy	===	===	===	===	===	hard
fair	===	===	===	===	===	unfair
bad	===	===	===	===	===	good
slow	===	===	===	===	===	fast
nice	===	===	===	===	===	awful
weak	===	===	===	===	===	strong
unsure	===	===	===	===	===	confident
restful	===	===	===	===	===	nervous
clear	===	===	===	===	===	confusing
neat	===	===	===	===	===	jumbled
dead	===	===	===	===	===	alive
still	===	===	===	===	===	active
hard	===	===	===	===	===	soft
light	===	===	===	===	===	heavy
temporary	===	===	===	===	===	lasting
alert	===	===	===	===	===	dull
meaningful	===	===	===	===	===	meaningless
usual	===	===	===	===	===	unusual
cheerful	===	===	===	===	===	solemn
smart	===	===	===	===	===	stupid
happy	===	===	===	===	===	sad
lively	===	===	===	===	===	deadly
like	===	===	===	===	===	dislike

Please place only one mark between each pair of words. Be sure not to leave out any of the pairs.

APPENDIX 3

The following instructions and scales, relative to the second round of ratings, were printed on machine-scoring answer sheets.

SUBJECT

	very much	a bit	neither	a bit	very much	
happy	===	===	===	===	===	sad
pleasant	===	===	===	===	===	unpleasant
exciting	===	===	===	===	===	tiresome
boring	===	===	===	===	===	interesting
lively	===	===	===	===	===	listless
like	===	===	===	===	===	dislike
bright	===	===	===	===	===	dull
nice	===	===	===	===	===	awful
dead	===	===	===	===	===	alive
alert	===	===	===	===	===	dull
still	===	===	===	===	===	active
meaningful	===	===	===	===	===	meaningless
smart	===	===	===	===	===	stupid
bad	===	===	===	===	===	good
useful	===	===	===	===	===	useless
important	===	===	===	===	===	unimportant
valuable	===	===	===	===	===	worthless
necessary	===	===	===	===	===	unnecessary
clear	===	===	===	===	===	confusing
hard	===	===	===	===	===	soft
light	===	===	===	===	===	heavy
easy	===	===	===	===	===	hard
familiar	===	===	===	===	===	strange
certain	===	===	===	===	===	uncertain

Please place only one mark between each pair of words. Be sure not to leave out any of the pairs.

APPENDIX 4

The following instructions and scales, relative to the third round of ratings, were printed on machine-scoring answer sheets.

List of Subjects (Mark opposite the one that applies)

Social Studies	--	Music	--
Mathematics	--	Art	--
Science	--	Drama	--
Reading (Literature)	--	Industrial Arts	--
Writing (Language)	--	Home Economics	--
Health	--	Typewriting	--
Physical Education	--	French	--

(Specify)

	very much	a bit	neither	a bit	very much	
exciting	===	===	===	===	===	tiresome
dislike	===	===	===	===	===	like
listless	===	===	===	===	===	lively
bright	===	===	===	===	===	dull
important	===	===	===	===	===	unimportant
worthless	===	===	===	===	===	valuable
unnecessary	===	===	===	===	===	necessary
useful	===	===	===	===	===	useless
hard	===	===	===	===	===	soft
light	===	===	===	===	===	heavy
easy	===	===	===	===	===	hard
confusing	===	===	===	===	===	clear
pleasant	===	===	===	===	===	unpleasant
boring	===	===	===	===	===	interesting
nice	===	===	===	===	===	awful
alive	===	===	===	===	===	dead
still	===	===	===	===	===	active
meaningless	===	===	===	===	===	meaningful
smart	===	===	===	===	===	stupid
bad	===	===	===	===	===	good
familiar	===	===	===	===	===	strange
sad	===	===	===	===	===	happy
alert	===	===	===	===	===	dull
uncertain	===	===	===	===	===	certain

Please place only one mark between each pair of words. Be sure not to leave out any of the pairs.

APPENDIX 5

Directions for Rating, Round 3

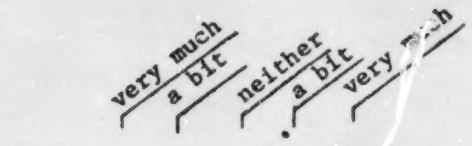
School Subjects Attitude Scales

Instruction Sheet

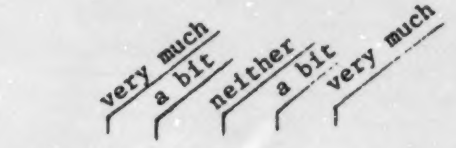
How students feel about school subjects is very important, therefore you are asked to fill out the response sheets that go with these instructions.

This is not a test. There are no "right" answers nor any "wrong" answers. The important thing is to tell how you feel about a school subject by rating it. Here are four examples of rating. In example 1, the color of this page is rated. In example 2, the color of the words printed on this page is rated.

Example 1

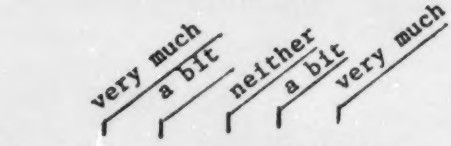


Example 2

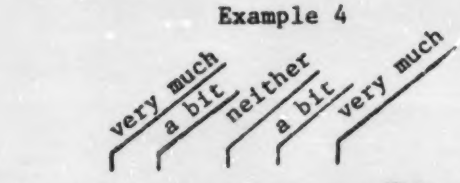


In example 3, the color dark grey is rated. In example 4, the color red is rated.

Example 3



Example 4

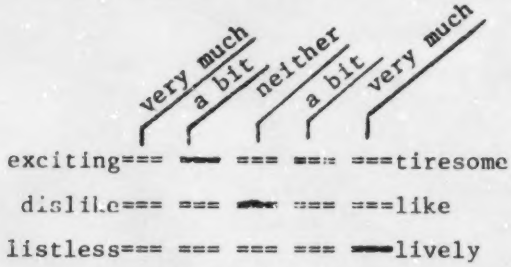


At the top of each response sheet write your name, grade and school, and indicate your sex in the spaces provided. When you have done this you will be asked to rate one of the school subjects in the list. Indicate the subject by marking the appropriate space.

For example, if you are asked to rate Social Studies you would fill in the space to the right as shown:

Social Studies —

Here is an example of rating Social Studies, where a student felt that it was a bit exciting, neither disliked nor liked it, and felt it was very much lively.



Please work quickly. It is better to give your first feelings rather than to think hard about each pair of words. Your responses will be read by a machine, so feel free to give your real opinions of school subjects.

You are now ready to start filling in the first response sheet. If you have any questions please raise your hand. If you don't understand some of the words on the sheet be sure to ask what they mean.

ADDENDUM 1

IMPROVING AND EXTENDING THE SCHOOL SUBJECTS ATTITUDE SCALES

IMPROVING AND EXTENDING THE SCHOOL SUBJECTS ATTITUDE SCALES

A Study Sponsored and Funded

by the

Planning and Research Branch

Alberta Education

Study conducted by

V.R. Nyberg, Professor, The University of Alberta
and
S.C.T. Clarke, Professor Emeritus, The University of Alberta

May, 1979

ACKNOWLEDGMENTS

The willing cooperation of many people facilitated the refinement of the SCHOOL SUBJECTS ATTITUDE SCALES. Appreciation is expressed to the superintendents of the two administrative units in which ratings of subjects were made: Jack Dobush, Superintendent of Schools, County of Lamont, and Elmer Gish, Superintendent of Schools, St. Albert Protestant Separate School District. Appreciation is also expressed to Andrew Goroniuk, principal of Andrew School, David Pirnak, principal of Lamont Junior-Senior High School, C. Kitura, principal of Lamont Elementary School, A.F. Swabb, principal of Mundare School, John Kurilla, principal of Sir Alexander MacKenzie School (St. Albert), John Bauman, principal of Lorne Akins Junior High School (St. Albert), Barry Findlater, principal of Dr. Cuts Junior High School (St. Albert), and John Hryniw, principal of Paul Kane Senior High School (St. Albert). Appreciation is also expressed to the teachers of the classes involved in the study for their assistance, and to the students who rated the various school subjects. The cooperation of all these people made possible the refinement of the scales.

Chuck Humphrey performed the computer analyses essential to the project, and his services are gratefully acknowledged, as are the services of Joel Bishop who performed the task of coding the answer sheets.

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IMPROVING AND EXTENDING THE SCHOOL SUBJECTS ATTITUDE SCALES

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PART 1

BACKGROUND AND PURPOSE

Background of the Study

The origin of the SCHOOL SUBJECTS ATTITUDES SCALES is described in the Alberta Education publication entitled Technical Report on the School Subjects Attitude Scales.[1] During 1978 the scales were developed through three rounds of administration to grade 5 and grade 8 students. Appendix 4 of the report mentioned above sets forth the scales produced as a result of the study.

Purpose of the Study

The purpose of the present study was to refine the School Subjects Attitude Scales instrument. The primary objective was to improve the test-retest reliability coefficients of the usefulness and difficulty scales in particular. Another important objective was to determine if the instrument was reliable for use at the high school level. Of lesser importance was the objective of making the instrument easier to use.

---

[1] Nyberg, V. R., and Clarke, S.C.T. "Technical Report on the School Subjects Attitude Scales." Edmonton: Alberta Education, 1979.

PART 2

THE SCALES AND THEIR REVISION

Revising the Scales

Factor analysis had revealed rather clearly three attitude factors or scales. These were labelled evaluation, usefulness, and difficulty. The first task in the revision was to finalize the list of bipolar adjectives. It was thought that use of the instrument would be made easier if each of the three scales contained the same number of adjective pairs. It was decided to have eight pairs in each scale, as this would result in an instrument containing a total of 24 pairs. This number of adjective pairs had proven successful in the field trials. This decision meant that the evaluation scale, with eleven bipolar pairs, had to be reduced, and the usefulness scale (seven bipolar pairs), and the difficulty scale (six bipolar pairs), had to be increased.

The scales as they existed at the commencement of the present study were as follows:

Evaluation

exciting - tiresome
dislike - like
listless - lively
bright - dull
pleasant - unpleasant
boring - interesting
nice - awful
alive - dead
still - active
sad - happy
alert - dull

Usefulness

important - unimportant
worthless - valuable
unnecessary - necessary
useful - useless
meaningless - meaningful
smart - stupid
bad - good

Difficulty

hard - soft
light - heavy
easy - hard
confusing - clear
familiar - strange
uncertain - certain

Additional adjective pairs had to be adopted for the usefulness and difficulty scales. Experience in administering the existing form had demonstrated that some students, particularly at the grade 5 level, had difficulty with the meaning of one or more words. One feature of the revisions was to add, in parentheses, brief definitions for terms which had been found to, or which were anticipated to, present difficulties with respect to meaning.

The revised scales, with the score value indicated for each response, are set forth below.

Evaluation

nice	+2	+1	0	-1	-2	awful
boring	-2	-1	0	+1	+2	interesting
unpleasant	-2	-1	0	+1	+2	pleasant
dislike	-2	-1	0	+1	+2	like
bright	+2	+1	0	-1	-2	dull
dead	-2	-1	0	+1	+2	alive
lively	+2	+1	0	-1	-2	listless (inactive, lazy)
exciting	+2	+1	0	-1	-2	tiresome (makes a person feel tired)

It may be observed that three adjective pairs were eliminated to bring the number to eight. These were: still-active, sad-happy, and alert-dull. These pairs had the lowest factor loadings.

As can be seen, a positive evaluation was signified by a positive score, a neutral evaluation by a score of zero, and a negative evaluation by a negative score. The magnitude of the positive or negative scores express degrees of attitude. These features apply to the other scales as well.

Usefulness

useless	-2	-1	0	+1	+2	useful
important	+2	+1	0	-1	-2	unimportant
impractical	-2	-1	0	+1	+2	practical
worthless	-2	-1	0	+1	+2	valuable
helpful	+2	+1	0	-1	-2	unhelpful
unnecessary	-2	-1	0	+1	+2	necessary
harmful	-2	-1	0	+1	+2	advantageous (brings goods or gain)
meaningful	+2	+1	0	-1	-2	meaningless

It may be noted that usefulness is associated with a positive score. Two pairs were added: impractical-practical, and harmful-advantageous, while one (smart-stupid) was dropped.

Difficulty

hard	-2	-1	0	+1	+2	easy
light	+2	+1	0	-1	-2	heavy (a lot of work)
clear	+2	+1	0	-1	-2	confusing (mixes a person up)
complicated	-2	-1	0	+1	+2	simple
elementary	+2	+1	0	-1	-2	advanced (beyond the beginning level)
strange	-2	-1	0	+1	+2	familiar
understandable	+2	+1	0	-1	-2	puzzling (hard to understand)
undemanding	+2	+1	0	-1	-2	rigorous (has to be exactly right)

It should be noted that difficulty is associated with a negative score on the scale. Two adjective pairs were added: complicated-simple, and undemanding-rigorous.

Administration of the Revised Instrument

After the changes already described had been made it was deemed desirable to try out the revised version once again. In addition to the grades 5 and 8 levels previously employed, administration of the scales was extended to the grade 11 level. Each class rated the same subjects twice, approximately one week after the first occasion, and at the grade 11 level the rating of mathematics was repeated at each sitting (separated by the rating of five other subjects). The format of the administration is set forth in Table 1.

Defining the Factors

It was intended that the three scales - evaluation, usefulness, and difficulty - be retained after revision. The evaluation scale posed no problem because the revision consisted only of dropping three adjective pairs. The other scales, however, were revised by adding new adjective pairs and dropping one pair. There was a danger, therefore, that new factors might emerge. This was checked out by conducting factor analyses and then observing the factor loadings of each bipolar pair. All the ratings of all of the school subjects made on the first testing occasion for each grade were used in the factor analyses.

Reliability

Test-retest reliability with an interval of approximately one week was determined by subject, scale, and grade.

An additional reliability check was made at the grade 11 level for mathematics, only. All grade 11 students were first asked to rate mathematics, then five other subjects, and then mathematics once more. The same procedure was employed when the students were retested one week after the first testing. This reliability check was made so as to eliminate, as far as possible, trait unreliability.

TABLE 1

TEST ADMINISTRATION SCHEDULE

School	Grade	N*	Dates	Subjects
Lamont	5	55	April 3	SS, Sci, PE, Math
	8	46	April 3	(same as for grade 5)
	11	74	April 3	SS, Sci, PE, Lit, Lang, Math
Lamont	5	55	April 9	(same as for April 3)
	8	46	April 9	(same as for April 3)
	11	74	April 9	(same as for April 3)
Mundare	5	21	April 4	SS, Sci, PE, Math
	8	39	April 4	(same as for grade 5)
	11	27	April 4	SS, Sci, PE, Lit, Lang, Option, Math
Mundare	5	21	April 11	(same as for April 4)
	8	39	April 11	(same as for April 4)
	11	27	April 11	(same as for April 4)
Andrew	5	22	April 4	SS, Sci, PE, Math
	8	36	April 4	(same as for grade 5)
Andrew	5	22	April 11	(same as for April 4)
	8	36	April 11	(same as for April 4)
Sir Alexander MacKenzie	5	113	April 5	SS, Sci, PE, Math
Dr. Cuts	8	86	April 18	SS, Sci, PE, Math
	8	86	April 29	Math, Sci, PE, SS
Lorne Akins	8	133	April 19	SS, Sci, PE, Math
	8	133	April 25	Math, Sci, PE, SS
Paul Kane	11	162	April 23	Math, SS, Sci, Lang, Lit, PE, Math
	11	162	April 24	(same as for April 23)
	11	162	April 25	(same as for April 23)
Paul Kane	11	162	April 30	Math, Lit, Lang, Sci, SS, PE, Math
	11	162	May 1	(same as for April 30)
	11	162	May 2	(same as for April 30)

* Number of students who were present on all testing days.

PART 3

RESULTS AND CONCLUSIONS

Results

Table 2 shows the results of the factor analyses conducted to determine the effectiveness of each pair of adjectives in the scales. It was noted that, at the grade 5 level, two of the bipolar pairs (elementary-advanced, and undemanding-rigorous) had low loadings on the difficulty scale. For grades 8 and 11, however, the loadings for these bipolars were considerably higher. It was presumed that the meanings of these pairs were not clear to a number of the grade 5 students.

It was decided that the twenty-four bipolar adjectives that made up the scales were satisfactory for use in schools without any further revision at this time.

Test-retest reliability data, based on a one week time lapse, are shown in Table 3. The figures in this table compare very favorably with the reliability data shown in Table 9 of the original Technical Report.[2] It should be noted that the earlier data were based on a one month time lapse, while the more recent data were based on a one week lapse. The reliability coefficients of the three scales clustered about a value of .8 in the revised instrument. This was considered quite satisfactory.

Concluding Statement

The latest revision of the School Subjects Attitudes Scales is a reliable and valid instrument for measuring attitudes towards school subjects. It is applicable to Alberta students ranging at least from as low as grade 5 and high as grade 11. The instrument can provide reliable and valid data on groups of students who are rating subjects, when they have the assurance that their teachers will not be able to identify ratings made by any student.

---

[2] Ibid., p. 18.

TABLE 2

VARIMAX ROTATED FACTOR LOADINGS BY GRADE

	Evaluation			Usefulness			Difficulty		
	5	8	11	5	8	11	5	8	11
nice-awful	.72	.73	.77						
boring-interesting	.73	.77	.80						
unpleasant-pleasant	.69	.71	.80						
dislike-like	.72	.71	.78						
bright-dull	.75	.78	.83						
dead-alive	.75	.79	.82						
lively-listless	.68	.76	.78						
exciting-tiresome	.67	.72	.73						
useless-useful				.66	.75	.78			
important-unimportant				.63	.83	.85			
impractical-practical				.65	.78	.82			
worthless-valuable				.71	.84	.87			
helpful-unhelpful				.65	.82	.85			
unnecessary-necessary				.74	.85	.84			
harmful-advantageous				.55	.67	.72			
meaningful-meaningless				.64	.72	.75			
hard-easy							.64	.72	.74
light-heavy							.61	.60	.72
clear-confusing							.65	.70	.72
complicated-simple							.66	.78	.82
elementary-advanced							.27	.45	.59
strange-familiar							.45	.55	.57
understandable-puzzling							.58	.65	.67
undemanding-rigorous							.27	.41	.55

Percentage variance accounted for:
Grade 5 - 53%
Grade 8 - 63%
Grade 11 - 68%

TABLE 3

TEST-RETEST RELIABILITY BASED ON A ONE WEEK TIME LAPSE

		Reliability		
Subject	Scale	Gd 5 (N = 85)	Gd 8 (N = 292)	Gd 11 (N = 191)
Social Studies	Evaluation	.64	.75	.74
	Usefulness	.63	.67	.67
	Difficulty	.61	.76	.71
Science	Evaluation	.73	.75	.79
	Usefulness	.65	.70	.72
	Difficulty	.73	.70	.78
Phys Ed	Evaluation	.67	.76	.77
	Usefulness	.78	.68	.74
	Difficulty	.78	.70	.72
Mathematics	Evaluation	.75	.80	.80
	Usefulness	.75	.79	.82
	Difficulty	.76	.81	.86
English Lang.	Evaluation			.69
	Usefulness			.71
	Difficulty			.73
English Lit.	Evaluation			.70
	Usefulness			.72
	Difficulty			.70
All Subjects	Evaluation	.72	.79	.84
	Usefulness	.82	.77	.84
	Difficulty	.79	.77	.82

TABLE 4

RELIABILITY ESTIMATES BASED ON FOUR TESTING OCCASIONS:
ATTITUDE TOWARDS MATHEMATICS

GRADE 11
N = 191

Factor		Occasion 2	3	4
Evaluation	1	.76	.80	.73
	2		.83	.84
	3			.88
Usefulness	1	.63	.82	.65
	2		.67	.74
	3			.78
Difficulty	1	.63	.86	.70
	2		.75	.85
	3			.80

Occasion code:

1 = day 1, 1st test
2 = day 1, 2nd test (30 min. after 1st test)
3 = day 2, 1st test (1 week after day 1
4 = day 2, 2nd test (30 min. after 1st test)

Note: correlations between occasions 1 and 2, and 3 and 4 are estimates of reliability that are not subject to trait unreliability. The correlation between occasion 1 and 3 appears alone in Table 3.

Recommendations

1. The revised scales should be as shown in Appendix 1.

The revised scales contain twenty-four bipolar adjectives, with an equal number (eight) in each scale. For one of the pairs, meaningful - meaningless, a brief definition was added because some of the students raised questions as to the meaning.

2. The instructions for the students should be as shown in Appendix 2.

Experience showed that students were not familiar with the task of rating. In the instructions four examples are given, and it is particularly noted that a "neither" rating can be used if the pair does not apply or if that which is being rated is thought to be midway between the bipolar adjectives. The instructions also illustrate the rating of a school subject.

3. Norms should be developed.

It is reiterated that norms should be developed at four distinct times of the year by grade, sex, and subject. In the absence of norms the scales can be used only for comparisons of groups and for research.

4. A hand-scoring procedure should be devised if and when the scales are put into production.

Hand-scoring would be laborious, but some users would probably employ this procedure.

APPENDIX 1

SCHOOL SUBJECTS ATTITUDE SCALES

Developed by
V. R. Nyberg, Professor, University of Alberta
and
S. C. T. Clarke, Professor Emeritus, The University of Alberta

School _____ Grade _____ Class _____

male ___ female ___

[ ]
Subject Rated

Please place only one mark between each pair of words. Be sure not to leave out any of the pairs.

	very much	a bit	neither	a bit	very much	
nice	===	===	===	===	===	awful
boring	===	===	===	===	===	interesting
unpleasant	===	===	===	===	===	pleasant
dislike	===	===	===	===	===	like
bright	===	===	===	===	===	dull
dead	===	===	===	===	===	alive
lively	===	===	===	===	===	listless (inactive, lazy)
exciting	===	===	===	===	===	tiresome (makes a person feel tired)
useless	===	===	===	===	===	useful
important	===	===	===	===	===	unimportant
impractical	===	===	===	===	===	practical (useful or workable)
worthless	===	===	===	===	===	valuable
helpful	===	===	===	===	===	unhelpful
unnecessary	===	===	===	===	===	necessary
harmful	===	===	===	===	===	advantageous (brings good or gain)
meaningful	===	===	===	===	===	meaningless (doesn't make sense)

	very much	a bit	neither	a bit	very much	
hard	===	===	===	===	===	easy
light	===	===	===	===	===	heavy (a lot of work)
clear	===	===	===	===	===	confusing (mixes a person up)
complicated	===	===	===	===	===	simple
elementary	===	===	===	===	===	advanced (beyond the beginning level)
strange	===	===	===	===	===	familiar
understandable	===	===	===	===	===	puzzling (hard to understand)
undemanding	===	===	===	===	===	rigorous (has to be exactly right)

APPENDIX 2

SCHOOL SUBJECTS ATTITUDE SCALES

Developed by
V. R. Nyberg, Professor, The University of Alberta
and
S. C. T. Clarke, Professor Emeritus, The University of Alberta

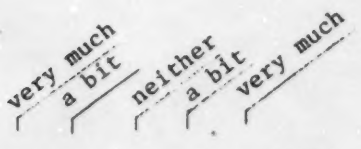
INSTRUCTIONS

How students feel about school subjects is very important, therefore you are asked to fill out the response sheet that goes with these instructions.

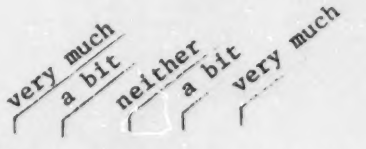
This is not a test. There are no "right" answers nor any "wrong" answers. The important thing is to tell how you feel about a school subject by rating it.

Here are four examples of rating. In example 1, the color of this page is rated. In example 2, the color of the words printed on this page is rated.

Example 1

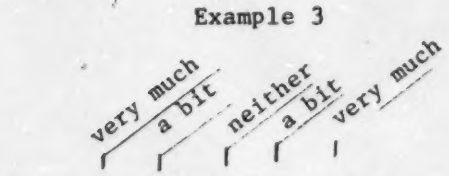


Example 2

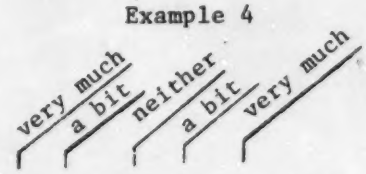


In example 3, the color dark grey is rated. In example 4, the color red is rated.

Example 3



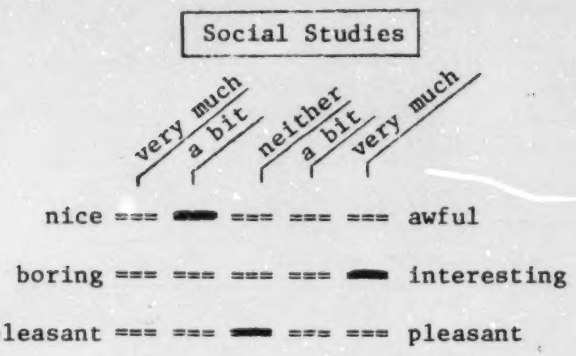
Example 4



You will notice in example 4 that if the scale does not apply (red is neither black nor white) the rating is neither. This rating would also be used if the scale applied, but the thing being rated was mid-way. A grey, exactly half way between black and white, would be rated neither.

School subjects are rated in the same way. For example, here is a rating of a school subject.

Subject Rated



The subject rated was social studies. The student felt that it was a bit nice, very much interesting, and neither pleasant nor unpleasant. In rating a school subject, all of the adjective pairs are completed.

Please work quickly. It is better to give your first feelings rather than to think hard about each pair of words. Notice that you are not asked to place your name on the sheet, as your opinions will be confidential.

If you do not know the meaning of some of the words, please ask.

ADDENDUM 2

MANUAL FOR ADMINISTRATION, SCORING, AND INTERPRETATION of the SCHOOL SUBJECTS ATTITUDE SCALES

MANUAL FOR ADMINISTRATION, SCORING, AND INTERPRETATION

of the

SCHOOL SUBJECTS ATTITUDE SCALES

Sponsored by

THE MINISTER'S ADVISORY COMMITTEE ON STUDENT ACHIEVEMENT

(MACOSA)

Funded by

THE PLANNING AND RESEARCH BRANCH, ALBERTA EDUCATION

Developed by

V.R. Nyberg, Professor, The University of Alberta

and

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SCHOOL SUBJECTS ATTITUDE SCALES

Description of the Scale

The School Subjects Attitude Scale was developed during 1978 and 1979 by V.R. Nyberg and S.C.T. Clarke of the University of Alberta. The project was recommended by the Minister's Advisory Committee on School Achievement and was funded by Planning and Research, Alberta Education.

The purpose in developing the scales was to make available an instrument for measuring students' attitudes toward school subjects. It was recognized that a number of goals of education involve the affective domain. While affective goals are important aspects of schooling no commercially prepared instruments for measuring students' attitudes toward school subjects were available. It was therefore decided that the feasibility of developing an instrument be explored.

The scales were developed as group (classroom) measures of students' attitudes toward school subjects. They were not intended for use with individuals.

A list of more than 100 bipolar adjectives was first assembled from various sources, including other semantic differential instruments. Through discussions with teachers and pupils, and through analysis of trial forms, twenty-four adjective pairs were selected. Factor analysis revealed three scales: evaluation, usefulness, and difficulty. Eight bipolar adjective scales were adopted for each scale.

Five spaces between each pair are available for the student to rate the school subject. These spaces are labelled, very much, a bit, neither, a bit, and very much. As in all semantic differential type scales, the concept to be judged, in this case the school subject, is rated by placing marks between the adjective pairs. In this way the student expresses what he or she thinks and feels about the school subject.

To date, norms are not available for the School Subjects Attitude Scale. In the absence of norms it is suggested that the scales be used for studies and research. One possible use is in program evaluation. Thus, if a change in program is proposed, student attitude prior to the change, soon after the change is implemented, and later, could be obtained. In the absence of normative data, which could show attitude change over time, the use mentioned would require a control group. Another use for the scales in their present state of development is for research. For example, the instrument could be used in a study of the effects of different class sizes. Still another use would be to compare the attitudes toward school subjects of different groups of students:

university-bound vs. non-university bound; main culture vs. subculture, etc. Another use would be to compare the attitudes toward school subjects of students in different schools. With proper safeguards, in their present stage of development the scales could be used for these and similar purposes.

One of the common features of attitude measurement is that the person involved usually detects the purpose and may give false responses. This "faking" usually involves giving responses which are thought to be socially acceptable. For example, if a student thinks the teacher of a subject will be able to identify his or her responses, the student may indicate that the subject is liked, is interesting, is useful, etc., to a greater extent than would be the case if anonymity were assured. If the measurement is to reflect the students' true attitudes, procedures must be adopted to minimize the motivation for faking.

Directions for Administering the Scale

Directions to the student are available with the scale and are not reproduced here. It is necessary that HB pencils be used if answer sheets are to be machine scored. Sufficient of these for the largest class will facilitate administration of the scale.

Because faking is possible, procedures should be adopted to reduce motivation for faking. These include the following: student anonymity (the student's name is not required on the answer sheet), no monitoring of responses by the teacher of the student in the subject being rated, and general explanations of the group nature of the results.

The person who administers the scale should be, to the student who is rating a subject, neutral with respect to the subject; eg., a non-teaching principal or vice-principal, teacher of another subject, school psychologist, or the like. Monitoring should be restricted to insuring that the rating is being done correctly. Names or other identifying data should not be prescribed for the response sheets. The person who collects the sheets should collect them face down, to avoid appearing to scrutinize responses. These suggestions for administration are all designed to reduce faking.

Students have seldom had experience with ratings. The first time the scales are administered to a class the directions to the student should be read with the students, and illustrated. Then the person administering the instrument should start the students on the scales with the "nice-awful" bipolar pair and illustrate how the rating of this pair should be made. The administrator should then indicate that the rest of the bipolar pairs are completed for the same subject in the same way.

Depending on the time required for students to grasp the task, the first administration of the scale may take ten to twenty minutes. Once having had experience, students can usually rate a school subject in five minutes.

Because attitudes toward school subjects may be colored by general attitudes (feeling tired or bored) for comparative uses it is suggested that the scale be administered during the second period of the school day.

Scoring

A zero score was adopted for the "neither" rating, and positive or negative scores of 1 or 2 for the remaining ratings for each bipolar pair. The items and scoring are shown for each scale below.

Evaluation

nice	+2	+1	0	-1	-2	awful
boring	-2	-1	0	+1	+2	interesting
unpleasant	-2	-1	0	+1	+2	pleasant
dislike	-2	-1	0	+1	+2	like
bright	+2	+1	0	-1	-2	dull
dead	-2	-1	0	+1	+2	alive
lively	+2	+1	0	-1	-2	listless (inactive, lazy)
exciting	+2	+1	0	-1	-2	tiresome (makes a person feel tired)

Usefulness

useless	-2	-1	0	+1	+2	useful
important	+2	+1	0	-1	-2	unimportant
impractical	-2	-1	0	+1	+2	practical
worthless	-2	-1	0	+1	+2	valuable
helpful	+2	+1	0	-1	-2	unhelpful
unnecessary	-2	-1	0	+1	+2	necessary
harmful	-2	-1	0	+1	+2	advantageous (brings good or gain)
meaningful	+2	+1	0	-1	-2	meaningless (doesn't make sense)

Difficulty

hard	-2	-1	0	+1	+2	easy
light	+2	+1	0	-1	-2	heavy (a lot of work)
clear	+2	+1	0	-1	-2	confusing (mixes a person up)
complicated	-2	-1	0	+1	+2	simple
elementary	+2	+1	0	-1	-2	advanced (beyond the beginning level)
strange	-2	-1	0	+1	+2	familiar
understandable	+2	+1	0	-1	-2	puzzling (hard to understand)
undemanding	+2	+1	0	-1	-2	rigorous (has to be exactly right)

It will be observed that a positive evaluation (nice, interesting, pleasant, like, bright, alive, lively, exciting) was signified by a positive score. Usefulness (useful, important, practical, valuable, helpful, necessary, advantageous, meaningful) was signified by a positive score. Difficulty (hard, heavy, confusing, complicated, advanced, strange, puzzling, rigorous) was associated with a negative score.

The scales can be machine scored, or a stencil can be made for hand scoring.

Reliability

The reliability of the scales varied from scale to scale, subject to subject, and grade to grade. Test-retest reliabilities with a one week interval vary from a low of 0.61 (Grade 5, Social Studies, Difficulty scale) to a high of 0.86 (Grade 11 Mathematics, Difficulty scale). The majority of test-retest reliability scores were in the 0.700 to 0.799 range. This level is satisfactory for uses associated with classroom groups. Further information on reliability is given in the Technical Report.

Validity

On four different comparisons the scales were found to be valid. The comparisons included expert opinion, student preferences, sex differences, and cultural differences. A study of the relationship with achievement and intelligence gave further evidence of validity, as did the factor analyses. For details, the reader is referred to the Technical Manual.

Interpretation of Results

Without norms the results can be used only for comparisons of local groups. Thus, in any school, comparisons can be made between students' attitudes toward different subjects (at a given grade level) or between the same subject at different grade levels. The user is reminded that the scoring system, centering as it does around zero, is conducive to numerically low scores and small differences. These are not, however, unimportant.

A repetition of the warning regarding faking is in order. Unless students are confident that their ratings are anonymous, they may be faked, and therefore, in no sense reflect true attitudes. With assurances of confidentiality, it has been found that students can and do honestly rate school subjects.